

REMARKS

Claims 1-6, 8-19, 21-31, 33-44, 46-55, 57-65 and 67-70 are pending in the application. Claims 1-6, 8-19, 21-31, 33-44, 46-55, 57-65 and 67-70 are rejected. Amendments to the application are shown above. The Applicant respectfully requests reconsideration of the application in view of the amendments and the following remarks.

Rejections under 35 U.S.C. § 101

Claims 1-70 are rejected under 35 U.S.C. § 101 because the claimed invention is directed to non-statutory subject matter. The Office Action states that the claimed invention lacks a real-world practical application.

Claim 1 has been amended to recite “outputting the probability density for modeling the input set of data” (emphasis added). Independent claims 14 and 27 have been amended similarly as claim 1. The Applicant submits that the instant § 101 rejections have been overcome. Accordingly, the Applicant respectfully requests that the instant § 101 rejections be withdrawn.

The Examiner’s attention is also directed to new claim 71 which recites “the method of claim 1 wherein the input set of data includes at least one of speech data or image data.”

Claim 39 has been amended to recite “outputting the modeling of the input set of data, wherein the modeling models at least one of speech data for determining a correct number of speakers from an unknown number of speakers or image data for discerning homogeneous regions in the image data” (emphasis added). No new matter has been added; the Examiner’s attention is directed to at least page 15, lines 17-24, of the Applicant’s specification as originally filed. Independent claims 50 and 61 have been

amended similarly as claim 39. The Applicant submits that the instant § 101 rejections have been overcome. Accordingly, the Applicant respectfully requests that the instant § 101 rejections be withdrawn.

Rejections under 35 U.S.C. § 112

Claims 1-70 are rejected under 35 U.S.C. § 112P1 as failing to comply with the written description requirement. As per claims 1-70, the Office Action states that the specification does not explain what makes an approximation “tractable.”

To satisfy the written description requirement, a patent specification must describe the claimed invention in sufficient detail that one skilled in the art can reasonably conclude that the inventor had possession of the claimed invention. There is a strong presumption that an adequate written description of the claimed invention is present when the application is filed (emphasis added) (MPEP 2163).

The Applicant submits that one skilled in the art would recognize that the Applicant had possession of the claimed invention at the time of filing. One of ordinary skill in the art would understand “tractable” approximation especially when considered in contrast to an “intractable” approximation. The Examiner’s attention is directed to page 9, lines 9-14, of the Applicant’s specification as originally filed and repeated here:

Exact inference of the Bayesian model is intractable. However, with the choice of exponential distributions to represent the prior distributions of the modeling parameters, tractable approximations are possible. In one implementation, for example, a tractable approximation may be obtained through Monte Carlo techniques.

The specification as originally filed provides meaning to one skilled in the art as to “tractable” approximation. On page 9 of the Office Action, the Examiner asks how is a tractable approximation performed; the Applicant discloses in the specification that implementations may use Monte Carlo techniques and variational inference (specification, page 9, lines 13-14). A variational inference implementation is described in detail on at least pages 9-14 of the specification.

In view of the above, the Applicant submits that the instant § 112P1 rejections as to the written description requirement have been overcome. Accordingly, the Applicant respectfully requests that the written description requirement rejections be withdrawn.

Claims 1-70 are rejected under 35 U.S.C. § 112P2 as being indefinite for failing to particularly point out and distinctly claim the subject matter of the invention. The Office Action states that the term “tractable” is relative and ambiguous, and therefore renders the claims indefinite.

Definiteness of claim language must be analyzed in light of: a) the content of the application disclosure, b) the teachings of the prior art, and c) the claim interpretation by one of ordinary skill in the art at the time of invention (MPEP 2173.02).

As discussed above, one of ordinary skill in the art would understand “tractable” approximation as recited in the claims especially when considered in contrast to an “intractable” approximation as taught in the Applicant’s specification as originally filed.

In view of the above, the Applicant submits that the instant § 112P2 rejections as to indefiniteness have been overcome. Accordingly, the Applicant respectfully requests that the indefiniteness rejections be withdrawn.

Rejections under 35 U.S.C. § 102 and § 103

Claims 1-6, 8-11, 14-19, 21-24, 27-31, 33-36, 39-44, 46-55, 57-65 and 67-70 are rejected under 35 U.S.C. 102(b) as being anticipated by Heckerman (US 5,704,018). Claims 12-13, 25-26, and 37-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heckerman (US 5,704,018) and further in view of Official Notice.

Claim 1 expressly recites (emphasis added):

A method comprising:
 selecting a modeling parameter from a plurality of modeling parameters
 characterizing a mixture of Student distribution components;
computing a tractable approximation of a posterior distribution for the selected modeling parameter based on an input set of data and a current estimate of a posterior distribution of at least one unselected modeling parameter in the plurality of modeling parameters;
 computing a lower bound of a log marginal likelihood as a function of current estimates of the posterior distributions of the modeling parameters, the current estimates of the posterior distributions of the modeling parameters including the computed tractable approximation of the posterior distribution of the selected modeling parameter;
 determining if the lower bound has been satisfactorily optimized, wherein the lower bound is satisfactorily optimized when the computed lower bound has changed less than a threshold amount from a previously computed lower bound;
 generating a probability density modeling the input set of data, the probability density including the mixture of Student distribution components, the mixture of Student distribution components being characterized by the current estimates of the posterior distributions of the modeling parameters, when the lower bound is satisfactorily optimized; and
 outputting the probability density for modeling the input set of data.

Heckerman is directed to generating improved belief networks. Heckerman discloses the concept of posterior probability distribution (col. 7, lines 22-24). Heckerman also discloses a univariate t-distribution (col. 16, lines 34-35). Heckerman uses the univariate t-distribution for handling missing data in the empirical data in the case of test networks containing all continuous variables (col. 16, lines 15-36). However, Heckerman fails to disclose using an unselected modeling parameter characterizing the univariate t-distribution and using input data to compute an approximation of a selected modeling parameter. Thus, Heckerman fails to disclose “*computing a tractable approximation of a posterior distribution for the selected modeling parameter based on an input set of data and a current estimate of a posterior distribution of at least one unselected modeling parameter in the plurality of modeling parameters*” as expressly claimed by the Applicant.

Thus, Heckerman fails to disclose at least one of the expressly recited limitations of claim 1. Accordingly, claim 1 is not anticipated by Heckerman. Independent claims 14, 27, 39, 50, and 61 distinguish for at least the same reason as claim 1. Claims 2-13, 15-26, 28-38, 40-49, 51-60, and 62-70 are dependent claims and distinguish for at least the same reasons as their independent base claims in addition to adding further limitations of their own. Therefore, the Applicant respectfully requests that the instant § 102 and § 103 rejections be withdrawn.

New Claims 71-72

The Applicant submits that new claims 71-72 are allowable based on their dependency from allowable independent claim 1.

No new matter has been added. For claim 71, the Examiner's attention is directed to at least page 15, lines 17-24, of the Applicant's specification as originally filed.

For claim 72, the Examiner's attention is directed to at least page 8, lines 6-12, of the Applicant's specification as originally filed. It is noted that Heckerman relies on "expert knowledge" and "empirical data" (col. 4, lines 25-34; col. 19, 42-46) while in contrast Applicant's claim 72 expressly recites using observed (i.e., empirical) data only.

Conclusion

Accordingly, in view of the above amendment and remarks it is submitted that all the rejections and/or objections to the application have been overcome. Based on the foregoing, Applicant respectfully requests that the application be allowed, and that a timely Notice of Allowance be issued in this case. If the Examiner believes, after this amendment, that the application is not in condition for allowance, the Examiner is invited to call the Applicant's attorney at the telephone number listed below.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicant hereby requests any necessary extension of time. If there is a fee occasioned by this response, including an extension of time fee that is not covered by an enclosed payment, please charge any deficiency to Deposit Account No. 50-0463. Any overpayment may be credited to the same account.

Respectfully submitted,
Microsoft Corporation

Date: August 27, 2007

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